What is claimed is:

1.   An out-of-band signaling model media control (MC) terminal for a Home
Phoneline Network Association (HPNA) network, the MC terminal comprising:

a Quality of Service (QoS) management entity (QME) receiving an end-to-end
QoS message characterizing a down-stream session for a user application, the end-to-end
QoS message including at least one QoS parameter set that is expressed at layer 3 and higher
of an ISO/IEC basic reference model of Open Systems Interconnection (OSI) (ISO/IEC 7498-
1) and is to be passed down to layer 2 of the MC terminal for enabling QoS traffic transport
for the session; and

an admission control entity (ACE) performing an admission control decision
relating to the session based on the end-to-end QoS message characterizing the QoS stream
and concurrent bandwidth usage of the HPNA network.

2.   The out-of-band signaling model MC terminal according to claim 1, wherein
the ACE includes at least one of a resource control module and a policy control module, the
resource control module, when part of the ACE, performing at least one admission control
decision relating to the session based on a resource permission, and the policy control
module, when part of the ACE, performing at least one admission control decision relating to
the session based on a policy permission.

3.   The out-of-band signaling model MC terminal according to claim 1, wherein
the ACE is part of the QME.

4.   The out-of-band signaling model MC terminal according to claim 1, wherein the end-to-end QoS message characterizing the session is a request for admitting the session to the HPNA network,

wherein the ACE, responsive to the end-to-end QoS message, rejects or admits the requesting session to the HPNA network based on an outcome of the admission control decision, and

wherein the QME, responsive to an admitted session, establishes at least one QoS stream in layer 2 of the MC terminal for transporting the traffic of the session between logical link control (LLC) sublayer entities within the HPNA network.

5.   The out-of-band signaling model MC terminal according to claim 4, wherein the QME assigns a QoS stream identifier (ID) to the admitted session.

6.   The out-of-band signaling model MC terminal according to claim 1, further comprising:

a frame classification entity (FCE) located at a logical link control (LLC) sublayer of the MC terminal, the FCE receiving a data frame for the down-stream session, the FCE classifying the received data frame for a media access control (MAC) sublayer based on QoS information associated with the received data frame and associating the classified data frame with a QoS stream queue physically located at the MC terminal and corresponding to a classification of the data frame; and

a frame scheduling entity (FSE) located at the MAC sublayer of the MC terminal, the FSE scheduling transmission of the data frame to a destination for the data frame based on a QoS requirement associated with the down-stream QoS stream.

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7.   The out-of-band signaling model MC terminal according to claim 6, wherein the FCE includes a frame classification table containing at least one entry having a frame classifier that is used for classifying the data frame received for the down-stream session.

8.   The out-of-band signaling model MC terminal according to claim 7, wherein the FSE includes a frame scheduling table containing QoS scheduling information for the QoS stream queue associated with the classified data frame.

9.   The out-of-band signaling model MC terminal according to claim 8, wherein the QoS scheduling information includes a set of QoS parameter values, a QoS stream identification (ID) for the QoS stream of the classified data frame and queue status information for the QoS stream queue.

10.   The out of band signaling model MC terminal according to claim 9, wherein the QME of the MC terminal receives an end-to-end QoS message containing information indicating that the down-stream QoS session is terminating,

wherein the FSE, in response to the end-to-end QoS message containing information indicating that the down-stream session is terminating, removes the corresponding entry from the scheduling table, and

wherein the FCE, in response to the end-to-end QoS message containing information that the down-stream session is terminating, removes the entry having the frame classifier that is used for classifying a data frame for the down-stream session from the classification table.

11.   The out-of-band signaling model MC terminal according to claim 5, wherein the received data frame is part of a down-stream session.

12.   The out-of-band signaling model MC terminal according to claim 5, wherein the down-stream session is a new session, and

wherein the QME assigns a QoS stream ID to the new down-stream session, passes the QoS stream ID and the frame classifier of the new session to the FCE, and passes the QoS stream ID and the QoS parameter values of the new session to the FSE;

wherein the FCE adds a new entry to the classification table corresponding to the new stream; and

wherein the FSE adds a new entry to the scheduling table corresponding to the new stream.

13.   The out-of-band signaling model MC terminal according to claim 5, wherein the destination for the data frame is at least one out-of-band signaling model non-media control (non-MC) terminal.

14.   The out-of-band signaling model MC terminal according to claim 13, wherein each non-MC terminal includes an FCE located at an LLC sublayer of the non-MC terminal, the FCE of at least one non-MC terminal receiving a data frame from a higher layer of the non-MC terminal than the LLC sublayer of the non-MC terminal, the data frame being part of a session originating at the non-MC terminal, the FCE of the non-MC terminal classifying the data frame received from the higher layer of the non-MC terminal for a MAC sublayer of the

non-MC terminal based on frame classification information contained in the received data frame, the FCE of the non-MC terminal associating the classified data frame with a QoS stream queue corresponding to a classification of the data frame received from the higher layer of the non-MC terminal.

15.   The out-of-band signaling model MC terminal according to claim 14, wherein the session originating at the non-MC terminal is an up-stream QoS stream.

16.   The out-of-band signaling model MC terminal according to claim 14, wherein the session originating at the non-MC terminal is a side-stream QoS stream.

17.   The out-of-band signaling model MC terminal according to claim 14, wherein the non-MC terminal further includes a frame scheduling entity (FSE) located at the MAC sublayer of the non-MC terminal, the FSE of the non-MC terminal scheduling transmission of the data frame received from the higher layer of the non-MC terminal based on QoS information associated with the data frame received from the higher layer of the non-MC terminal.

18.   The out-of-band signaling model MC terminal according to claim 17, wherein the FSE of the non-MC terminal includes a frame scheduling table containing QoS scheduling information for the QoS stream queue associated with the classified data frame.

19.   The out-of-band signaling model MC terminal according to claim 18, wherein the QME of the non-MC terminal receives a frame having associated QoS information indicating a corresponding QoS stream originating at the non-MC terminal is terminating,

wherein the FSE of the non-MC terminal, in response to the QoS information indicating that the session originating at the non-MC terminal is terminating, removes an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table at the non-MC terminal, and

wherein the FCE of the non-MC terminal, in response to the QoS information indicating the session originating at the non-MC terminal is terminating, removes an entry having a frame classifier for classifying a data frame that is part of the session originating at the non-MC terminal.

20.   The out-of-band signaling model MC terminal according to claim 19, wherein the non-MC terminal sends an end-to-end QoS message containing QoS information indicating that the session is terminating,

wherein the QME of the MC terminal receives the end-to-end QoS message containing information indicating that the QoS session is terminating, and

wherein the FSE of the MC terminal, in response to the end-to-end QoS message containing information indicating that the session is terminating, removes an entry from the scheduling table corresponding to the session that is terminating.

21.   The out-of-band signaling model MC terminal according to claim 1, wherein the QoS stream is a multimedia session QoS stream.

22.   The out-of-band signaling model MC terminal according to claim 1, wherein the QoS stream is a voice session QoS stream.

23.   The out-of-band signaling model MC terminal according to claim 1, wherein the QoS stream is a data session QoS stream.

24.   An out-of-band signaling model non-media control (non-MC) terminal for a Home Phoneline Network Association (HPNA) network, the non-MC terminal comprising:

a Quality of Service (QoS) stream queue located at a media access control (MAC) sublayer of the non-MC terminal, the QoS stream having at least one associated QoS parameter value; and

an FCE located at an LLC sublayer of the non-MC terminal, the FCE of the non-MC terminal receiving a data frame from a layer higher than the LLC layer of the non-MC terminal and classifying the received data frame for a MAC sublayer of the non-MC terminal based on QoS information associated with the received data frame, the FCE of the non-MC terminal associating the classified data frame with the QoS stream queue when a classification of the data frame corresponds to the at least one QoS parameter value associated with the QoS stream queue.

25.   The out-of-band signaling model non-MC terminal according to claim 24, wherein the QoS session is an up-stream session.

26.   The out-of-band signaling model non-MC terminal according to claim 24, wherein the QoS session is a side-stream session.

27.   The out-of-band signaling model non-MC terminal according to claim 23, wherein the non-MC terminal further includes a frame scheduling entity (FSE) located at the MAC sublayer of the non-MC terminal, the FSE of the non-MC terminal scheduling transmission of the data frame received from the higher layer of the non-MC terminal based on QoS information associated with the data frame received from the higher layer of the non-MC terminal.

28.   The out-of-band signaling model non-MC terminal according to claim 27, wherein the FSE of the non-MC terminal includes a frame scheduling table containing QoS scheduling information for the QoS stream queue associated with the classified data frame.

29.   The out-of-band signaling model non-MC terminal according to claim 28, wherein the non-MC terminal includes a QoS management entity (QME) that receives a frame having associated QoS information indicating a corresponding QoS stream originating at the non-MC terminal is terminating,

wherein the FSE of the non-MC terminal, in response to the QoS information indicating that the session originating at the non-MC terminal is terminating, removes an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table at the non-MC terminal, and

wherein the FCE of the non-MC terminal, in response to the QoS information indicating the session originating at the non-MC terminal is terminating, removes an entry having a frame classifier for classifying a data frame that is part of the session originating at the non-MC terminal.

30.   The out-of-band signaling model non-MC terminal according to claim 29, wherein the non-MC terminal sends an end-to-end QoS message to a media control (MC) terminal of the HPNA network, the MC terminal includes a QoS management entity (QME), an FCE located at an LLC sublayer of the MC terminal and an FSE located at a MAC sublayer of the MC terminal, the MC terminal further includes a virtual QoS stream queue corresponding to the QoS stream originating at the non-MC terminal, the end-to-end QoS message containing QoS information indicating that the session originating at the non-MC terminal is terminating,

wherein the QME of the MC terminal receives the end-to-end QoS message containing information indicating that the QoS session originating at the non-MC terminal is terminating,

wherein the FSE of the MC terminal, in response to the end-to-end QoS message containing information indicating that the session originating at the non-MC terminal is terminating, removes the corresponding entry from the scheduling table of the MC terminal.

31.   The out-of-band signaling model non-MC terminal according to claim 24, wherein the QoS stream is a multimedia session QoS stream.

32.   The out-of-band signaling model non-MC terminal according to claim 24, wherein the QoS stream is a voice session QoS stream.

33.   The out-of-band signaling model non-MC terminal according to claim 24, wherein the QoS stream is a data session QoS stream.

34.   A method for controlling media access in an out-of-band signaling model Home Phoneline Network Association (HPNA) network, the method comprising steps of:

receiving an end-to-end QoS message at a Quality of Service (QoS) management entity (QME) of an out-of-band signaling model media control (MC) terminal, the end-to-end message characterizing a down-stream session for a user application and including at least one QoS parameter set that is expressed at layer 3 and higher of an ISO/IEC basic reference model of Open Systems Interconnection (OSI) (ISO/IEC 7498-1) and is to be passed down to layer 2 of the MC terminal for enabling QoS traffic transport for the session; and

performing an admission control decision relating to the down-stream session based on the end-to-end QoS message characterizing the QoS stream and concurrent bandwidth usage of the HPNA network.

35.   The method according to claim 34, wherein the step of performing the admission control decision relating to the down-stream session based on a resource permission.

36.   The method according to claim 34, wherein the step of performing the admission control decision relating to the down-stream session based on a policy permission.

37.   The method according to claim 34, wherein the at least one end-to-end QoS message characterizing the down-stream session is a request for admitting the session to the HPNA network,

the method further comprising steps of:

rejecting or admitting the requesting session to the HPNA network based on an outcome of the admission control decision, and

establishing a down-stream stream in layer 2 of the MC terminal for transporting the traffic of the session between logical link control (LLC) sublayer entities within the HPNA network.

38.   The method according to claim 37, further comprising a step of assigning a QoS stream identifier (ID) to the admitted session.

39.   The method according to claim 34, further comprising steps of:

receiving a data frame for the down-stream session at a logical link control (LLC) layer of the MC terminal, the data frame being received from a higher layer of the MC terminal than the LLC layer of the MC terminal;

classifying the data frame received from the higher layer of the MC terminal for a media access control (MAC) layer of the MC terminal based on QoS information associated with the data frame received from the higher layer of the MC terminal; and

associating the classified data frame with a QoS stream queue corresponding to a classification of the data frame and associated with the QoS stream in layer 2 of the MC terminal.

40.   The method according to claim 39, further comprising a step of scheduling transmission of the data frame to a destination for the data frame based on a QoS requirement associated with the down-stream QoS stream.

41.   The method according to claim 34, further comprising a step of forming a frame classification table containing at least one entry having a frame classifier that is used for classifying the data frame received from the higher layer of the MC terminal based on the QoS information associated with the data frame received from the higher layer of the MC terminal.

42.   The method according to claim 41, further comprising a step of forming a frame scheduling table containing an entry having QoS scheduling information for the QoS stream queue associated with the classified data frame.

43.   The method according to claim 42, wherein the QoS scheduling information includes a set of QoS parameter values, a QoS stream identification (ID) for the QoS stream of the classified data frame and queue status information for the QoS stream queue.

44.   The method according to claim 43, further comprising steps of:

        receiving at the QME of the MC terminal an end-to-end QoS message containing information that the down-stream QoS session is terminating;

        removing the corresponding entry from the frame scheduling table for the QoS stream queue associated with the session in response to the information that the down-stream QoS session is terminating; and

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removing an entry from the frame classification table having the frame classifier that is used for classifying a data frame that is part of the down-stream session in response to the information that the down-stream QoS session is terminating.

45.   The method according to claim 39, wherein the down-stream session is a new session,

the method further comprising a step of adding a new entry to the frame classification table corresponding to the new stream.

46.   The method according to claim 39, wherein the destination for the data frame is at least one out-of-band signaling model non-media control (non-MC) terminal.

47.   The method according to claim 46, further comprising steps of:

receiving a data frame at an LLC sublayer of the non-MC terminal from a layer higher than the LLC sublayer of the non-MC terminal;

classifying the data frame received from the higher layer of the non-MC terminal for a MAC sublayer of the non-MC terminal based on QoS information associated with the data frame received from the higher layer of the non-MC terminal; and

associating the classified data frame with a QoS stream queue at the non-MC terminal corresponding to a classification of the data frame.

48.   The method according to claim 47, wherein the data frame received from the higher layer of the non-MC terminal is part of an up-stream QoS stream.

49.   The method according to claim 47, wherein the data frame received from the higher layer of the non-MC terminal is part of a side-stream QoS stream.

50.   The method according to claim 47, further comprising a step of scheduling transmission of a data frame based on QoS information associated with the data frame received from the higher layer of the non-MC terminal.

51.   The method according to claim 50, further comprising a step of forming a frame scheduling table containing QoS parameter information for the QoS stream queue associated with the classified data frame.

52.   The method according to claim 51, further comprising steps of:

receiving at the QME of the non-MC terminal receives a frame having associated QoS information indicating a corresponding QoS stream originating at the non-MC terminal is terminating,

removing an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table at the non-MC terminal in response to the QoS information indicating that the session originating at the non-MC terminal is terminating, and

removing an entry having a frame classifier for classifying a data frame that is part of the session originating at the non-MC terminal in response to the QoS information indicating the session originating at the non-MC terminal is terminating.

53.   The method according to claim 52, further comprising steps of:

sending an end-to-end QoS message from the non-MC terminal to a media control (MC) terminal of the HPNA network, the MC terminal including a virtual QoS stream queue corresponding to the QoS stream originating at the non-MC terminal, the end-to-end QoS message containing QoS information indicating that the QoS session originating at the non-MC terminal is terminating;

receiving at the MC terminal the end-to-end QoS message containing information indicating that the QoS session originating at the non-MC terminal is terminating; and

removing at the MC terminal an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table in response to the QoS information indicating that the session originating at the non-MC terminal is terminating.

54.   The method according to claim 34, wherein the QoS stream is a multimedia session QoS stream.

55.   The method according to claim 34, wherein the QoS stream is a voice session QoS stream.

56.   The method according to claim 34, wherein the QoS stream is a data session QoS stream.

57.   A method for controlling media access in an out-of-band signaling model Home Phoneline Network Association (HPNA) network, the method comprising steps of:

forming a Quality of Service (QoS) stream queue located at a media access

control (MAC) sublayer of an out-of-band signaling model non-media control (non-MC)

terminal, the QoS stream having at least one associated QoS parameter value;

receiving a data frame at an LLC sublayer of the non-MC terminal from a

layer higher than the LLC sublayer of the non-MC terminal;

classifying the data frame received from the higher layer of the non-MC

terminal for a MAC sublayer of the non-MC terminal based on QoS information associated

with the data frame received from the higher layer of the non-MC terminal; and

associating the classified data frame with the QoS stream queue when a

classification of the data frame corresponds to the at least one QoS parameter value

associated with the QoS stream queue.

58.   The method according to claim 57, wherein the data frame received from the

higher layer of the non-MC terminal is part of an up-stream QoS stream.

59.   The method according to claim 57, wherein the data frame received from the

higher layer of the non-MC terminal is part of a side-stream QoS stream.

60.   The method according to claim 57, further comprising a step of forming a

frame classification table containing at least one entry having a frame classifier that is used

for classifying the data frame received from the higher layer of the non-MC terminal based

on the QoS information associated with the data frame received from the higher layer of the

non-MC terminal.

61.   The method according to claim 60, further comprising a step of scheduling transmission of the data frame received from the higher layer of the non-MC terminal based on QoS information associated with the data frame.

62.   The method according to claim 61, further comprising a step of forming a frame scheduling table containing QoS parameter information for the QoS stream queue associated with the classified data frame.

63.   The method according to claim 62, further comprising steps of:

receiving at the non-MC terminal a frame having associated QoS information indicating that a corresponding QoS session originating at the non-MC terminal is terminating;

removing an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table at the non-MC terminal in response to the QoS information indicating that the session originating at the non-MC terminal is terminating; and

removing an entry from the classification table that is used for classifying the received data frame having associated QoS information indicating that the QoS session originating at the non-MC terminal is terminating in response to the associated QoS information that the session is terminating.

64.   The method according to claim 63, further comprising steps of:

sending an end-to-end QoS message from the non-MC terminal to an out-of-band model media control (MC) terminal of the HPNA network, the MC terminal including a virtual QoS stream queue corresponding to the QoS stream originating at the non-MC

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terminal, the end-to-end QoS message containing QoS information indicating that the QoS session originating at the non-MC terminal is terminating;

receiving at the MC terminal the end-to-end QoS message containing information indicating that the QoS session originating at the non-MC terminal is terminating at the MC terminal; and

removing at the MC terminal an entry corresponding to the session originating at the non-MC terminal from the frame scheduling table in response to the QoS information indicating that the session originating at the non-MC terminal is terminating.

65.   The method according to claim 57, wherein the QoS stream is a multimedia session QoS stream.

66.   The method according to claim 57, wherein the QoS stream is a voice session QoS stream.

67.   The method according to claim 57, wherein the QoS stream is a data session QoS stream.